



MEMO

TO: Governor's STEM Council Advisory Council

FROM: Jeff Weld, Executive Director – Governor's STEM Advisory Council

DATE: November 3, 2011

RE: Summary – Governor's STEM Advisory Council Meeting 1

Thanks for investing your time and insights on Halloween day. We covered A thru H below. Please reply with any adjustments to this summary that are needed.

Members in attendance were co-chairs Lt. Governor Kim Reynolds and President Benjamin Allen, Executive Committee members John Carver, Robert Denson, Debi Durham, Donald Frazer, Jason Glass, Gregory Geoffroy, Raynard Kington, Paul Schickler, Teresa Wahlert, Gail Wortmann, Advisory Council members Patrick Barnes, Carolyn Boss, Rep. Josh Byrnes, Senator Mark Chelgren, Jordan Cohen, Cindy Dietz, Douglas Dorner, Deb Dunkhase, Teresa Finkin, Nancy Foerstel, , Alison Gilchrist, Jeff Herzberg, Rachel Hurley, Leann Jacobson, Craig Johnson, Alissa Jourdan, Valerie Newhouse, Gary Scholten, Victoria Sharp, Representative Sharon Steckman, Catherine Swoboda, Kichoon Yang, Isa Zimmerman, and Executive Director Jeff Weld. Proxies in attendance were David Drake for Sally Mason, Gary Mirka for Jonathan Wickert, and Steven Triplett for Jon Erickson. Members not able to be present were Lin Chapé and Senator Brian Schoenjohn. Thirteen guests were present.

- A. A **"sunrise session"** profiling the Iowa STEM Education Roadmap was attended by 26 members and guests. Co-facilitators Cindy Dietz and Jeff Weld provided background on the genesis of the document and its purpose. Lively exchange among attendees ensued spanning issues of school leadership, modern pedagogy, role of the private sector, and more. The Roadmap's "targets" coincide with the Goals of the Governor's STEM Advisory Council and the Priorities established by the Council in support of those goals.
- B. **Opening** welcome by Lt. Governor Kim Reynolds (preceded by facility host's welcome by the Science Center of Iowa's Art Wittmack), situated the challenge facing Iowa – an urgency to inspire our youth to engage in STEM for the future. This Council is Iowa's best collective step forward, representing both great hope and great expectations. President Allen followed with contextual placement of the Iowa Math & Science Education Partnership in the time line leading to this convening, and framed the importance of the work to come for Iowa's educational and economic future. Both co-chairs thanked Council members for their

willingness to lead Iowa in STEM education. Lt. Governor Reynolds recognized and thanked each Council member in attendance.

- C. **Work-to-date** on the part of the Co-Chairs and the Executive Committee working with the Executive Director was summarized by Weld. Following this summary are the questions and comments that arose in this segment of the meeting.
- a. **Year 1** of the Council is aimed at creating the infrastructure for managing STEM innovation, and implementing high-impact solutions for the top priority of student interest/achievement in STEM. Performance metrics for year 1 are being drafted for Executive Committee and Council consideration.
 - b. Methodical, sustainable **action planning** for a 1 and 5 year plan on 7 priorities in support of the Goals of the Council will commence immediately. Additional action plan working group members will be appointed by the Executive Committee from outside the Advisory Council.
 - c. **Regional Network** planning will commence upon appointments to the subcommittee by the Executive Committee, including some members from outside the Council. Broad guidelines for the establishment of Networks have been provided by the Exec. Committee.
 - d. **Scalable program** planning (i.e., demonstrating success in achieving the top priority) planning will commence upon appointments to the subcommittee by the Executive Committee, including some members from outside the Council. Broad guidelines for the establishment of Networks have been provided by the Exec. Committee.
 - e. An **evaluation model** initiated by the Center for Social and Behavioral Research at UNI in consultation with UI's Center for Evaluation and Assessment and ISU's Research Institute for Studies in Education was reviewed. Evaluation partners will include community college and Iowa Department of Education evaluators.
 - f. A request for **FY 2013 State funding** was shared with members, essentially tied to three areas of focus: (1) the establishment and support of Regional Networks; (2) Statewide STEM responsibilities both established (e.g., PLTW and Iowa-Teach) and proposed (e.g., public awareness); and (3) Continuation of the management-arm function of the IMSEP. Cost-sharing from non-state funds is prominently factored in to the budget for fulfilling the goals of the Governor's STEM Advisory Council.

Discussion regarding Regional Networks included the consideration of existent STEM networks in Iowa, such as the successful Corridor STEM Initiative. The Executive Director relayed the Council's sentiment of importance to complement and enhance rather than divert from the valuable STEM work already taking place in many regions of Iowa. It will be important to inventory these programs. This will be a key responsibility of the work of the subcommittee. Other emergent networks, such as regional Professional Development networks of the AEAs and other entities will be powerful, mutually beneficial leverage points. Other capacity-building opportunities for Iowa, prominently including the recent NSF-EPSCoR award to Iowa, align well with the STEM Advisory Council's goals, especially linkages with industry and a commitment to build a diverse workforce.

Discussion regarding Scalable program planning included the mention of noteworthy programs ongoing in Iowa, including GEAR-UP (<http://www.gearupiowa.gov/>), I-JAG (<http://www.ijag.org/>), Hyperstream (<http://hyperstream.org/>), KidWind (<http://learn.kidwind.org/>), and many, many more, some of which are catalogued in the IMSEP inventory. The subcommittee will be charged with developing a scale plan and process which will not interfere with existing programs and in some case may provide an opportunity for their replication elsewhere in Iowa. A set of criteria for what constitutes eligibility will be needed, and will be charged as a responsibility to the subcommittee.

Discussion regarding FY 2013 Budget Request included the importance of documenting and tracking business match in STEM education. The question of whether private sector matching funds would be sought at the regional or state level was raised. It would be good to know prior to the legislative session what we can expect as to investment from the private sector in order to demonstrate commitment. The January meeting of the Advisory Council will focus on public-private partnership in STEM education – a venue for collecting that information perhaps. The legislative appropriation to IMSEP (\$1.7M for FY 2012) was discussed and clarified to be integrated into the request for FY 2013 in a reduced form, diverting most of the funds to Regional Networks, Scale-up, and statewide STEM functions. The question was raised as to models known to exist for State STEM, and which we're emulating. The Governor's STEM Advisory Council of Massachusetts has shown success using tactics similar to those on the drawing board in Iowa. See <http://www.mass.edu/forinstitutions/prek16/pipeline.asp>

Advisory Council member Dr. Isa Zimmerman also serves on the Massachusetts Governor's STEM Advisory Council. She shared additional detail on the similar efforts of our States. She lauded the idea that a state can learn from another. Massachusetts is ahead of Iowa in some respects. They have a two-tiered structure of an Advisory Council and an Operations Board. The Operations Board does the work and the Executive Council develops policy. They have developed an "At-Scale" program. They have identified six projects that could be scaled by the seven regions in Massachusetts. These projects range from professional development to student enrichment projects. "At-Scale" projects are intended to help get STEM out front, get parents engaged, get communities involved and address opportunity and need and to demonstrate urgency to the business community. Teacher preparation, especially at the elementary level, is also addressed. Iowa's Executive Committee mirrors Massachusetts experience. It is important for scalable programs to be evaluated. Massachusetts has room to grow on this aspect. In Massachusetts, they are trying to NOT duplicate, reinvent or have 1,000 points of light. Massachusetts is a local control state. They have put an effort into getting people to appreciate one another's work. As to which State Massachusetts looks toward as a model, they "are blazing a trail." Massachusetts model pays attention to infrastructure to assure sustainability.

Iowa's unique fingerprint will come through the needs and deliverables for which we have capacity, aimed at Iowa-specific educational and economic demand such as in bioscience innovation, etc. Meanwhile it was asserted that well-known best practices for drawing women and under-tapped student populations into STEM will be key to our success, as they are in Massachusetts. In fact, a Minnesota guest suggested we consider inter-state collaboration, especially in the marketing realm. Along the lines of marketing, it was pointed out that Iowa's

constitution says there are no special groups in Iowa but that all children should enjoy excellent learning opportunities without preferential treatment. The notion of inclusiveness is important, it was posited, while recognizing that everything we do we should think of all the lenses in which this may be seen. We want all students to get more involved and better prepared.

The funding model in Massachusetts was brought up. Dr. Zimmerman informed the Council that an infrastructure subcommittee was to propose a funding program. They proposed passing legislation that every STEM company donate some small percentage of its profits to STEM. It was not accepted!. The regions are working with local companies for match funding with “At-Scale” projects. Nothing has yet materialized. Tim Murray, Massachusetts’s Lt. Governor, has announced an amount from the supplemental budget targeted toward “At-Scale” projects. The STEM Pipeline fund is used to maintain the regional centers. In the Commonwealth of Massachusetts there are companies who have supported certain curriculum projects which may or may not be what is needed. They hope to organize this better rather than to just have the “one-offs.” One of the guest keynote speakers pointed out that Ohio provides \$200 million for scholarships in STEM. They have leveraged \$70 million in public/private partnership dollars in three years.

E. Keynote presentations of Dr. Linda Rosen and of Jan Morrison framed Iowa’s STEM education situation against a national backdrop. Both Powerpoint presentations, as well as the ACT, Inc. information slide, are available at http://www.iowamathscience.org/exec_comm.

Video recording of both presentations will be available in about one week.

Discussion directed to and involving the Keynotes included clarification regarding the design principles of the new science standards. Jan Morrison cited the embedded technology and engineering requirements. Linda Rosen reinforced the importance of moving forward with common standards and assessments. 45 states have signed on.

ELL was brought up and Jan Morrison reminded the Council that our diversity is only going to increase and that we have to get a handle on this. We have to find a way to communicate. Content-based learning, contextual learning and project-based learning help move the language along. Teaming in classrooms with teachers regardless of age group is costly and usually goes away in an economic downturn. When asked about retraining, Jan Morrison said the federal government has mandated that we deal with disaffected workers. There are a number of nonprofits with STEM that are workforce focused. They provide services to return people to the classroom or toward a GED or to the workforce through community colleges. Gear-Up is one such program. Districts are relying upon non-profits and faith-based entities. The reality is that juveniles who have encountered the justice system cannot work in certain STEM industries because it has become a Homeland Security Issue. The same is true with veterans who have previously encountered the justice system early on.

When it comes to pitfalls which Iowa should try to avoid, Jan Morrison cautioned against “Network behavior”. The work loses value if the issue is the network. It has to be about “good

work to do together, not just rhetoric.” Linda Rosen cautioned against glorification of the status quo where what you are already doing gets elevated. You need the hard edge of outside perspectives. Not everything you are doing is working, and not everything you are doing is worth glorifying.

Keynote Q and A continued after lunch. The speakers were asked about engaging parents. Jan Morrison cited the T-STEM of Texas which is more mature than most. It moves well past high school and includes parents and early childhood education. The constraint is public/private funding. So at present they are only able to fund middle school and high school.

Linda Rosen pointed out that Massachusetts is also looking at Pre-K.

Asked about guidance on how to get education to match STEM options, Linda Rosen cautioned on thinking in terms of career tracks. You can’t set up an education system based on careers. Georgetown University is doing research to try to break apart careers by knowledge. She recommended seeing Change the Equation 2012 ENVISION project for youth engagement with STEM. On this, Jan Morrison cited Tony Wagner with Global Education Gap, thinking of things as “at least” STEM (not only STEM).” There are pathways that align with certain interests that have certain skills.

On the matter of increasing STEM job retention from 19% to 50% of those degreed in STEM-related fields, Linda Rosen shared that the younger generation is going through more occupations than most imagined they would go through. You can give a person necessary insights and skills. There is data that STEM jobs pay better and the gender gap is smaller. There are lessons to be drawn. This generation wants to do good. They don’t just want to do well. You need to pick three or four things to hang your hat upon. On this, Jan Morrison said a robust STEM teaching core makes robust STEM workers. Take the vision of multiple occupations into consideration.

The concern was expressed that it will be a number of years before we fix K-12 STEM education and that in the interim we need to prepare students who may be under prepared in STEM to catch up. Linda Rosen said teachers do not have a good toolbox to help these kids and keep the rest moving forward. You have to identify the most pressing issues and focus. Jan Morrison cautioned that it can divert our attention and resources to look at developmental math or “dead” math innovations which have no evidence of pathway promise. We are pouring resources into it due to this short-term crisis. The IES-NOEL Grant is three years into a ten-year student into inquiry research for effectiveness. Story regarding General Electric: GE sent back 5,000 engineers to do mathematics because the newbies could not apply mathematics (and these are top-tier engineers). STEM majors being remediated is over 50%. Dr. Zimmerman offered a model proposal that there be a as a 13th year for those who are not prepared in STEM before they go forward to any form of higher education. Another model is Special education which produces good results for certain kids and it is the right thing to do. It is costly and labor intensive. Why not provide the same level of support for kids in STEM? Linda Rosen advised the Council to be as reality based in the short terms as you can--given the financial situation. Dual enrollment has shown some evidence of success.

The question arose as to focus on the beginning years and evidence that there growth from there to build upon. Jan Morrison said we want to know what happens at the age of ten where the breaks go on with kids (and also with teachers). Linda Rosen recommended we leverage interest, time and money, you cannot move forward with all of them at once.

A council member noted that until fourth grade Iowa kids are the best, then it trails off. In the long term it comes down to resources. What percentage of the resources should go to short term versus long term planning? Linda Rosen suggested we need to invest enough in the short term to have roots and demonstrate results so that the initiative can sustain itself beyond and across political administrations. Jan Morrison pointed out that not everything requires funding. Some of the finest policy decisions do not cost money. You need champions to get past the policy mine fields.

F. Action Plan working groups were formed and work begun. After 1 hour, each group was asked to report out on preliminary thinking. The following are approximate summaries of each group's report.

- **Technology Enhanced Instruction for Global Learning.** *Discussed EdChats; hybrid online tutorial for teachers/practitioners. There is a lot of technology out there. We need to leverage what we have.*
- **STEM Teacher Recruitment and Preparation.** *What is STEM? What is really being learned? How can we expand Iowa-Teach to other institutions? Can we identify bright spots in the state that are working? Alternative Licensure came up. Another question: Industry pays its interns. Student teachers are not paid. Look at the business model to bring student teachers into that. Outside the box thinking. Need for constant learning. How do we find the opportunity to retrain and continue to train the spectrum of teachers from kindergarten through?*
- **STEM Learner Readiness for Post-Secondary Education and Career.** *We need periodic analysis of mentoring and job awareness to see opportunities that are out there. The group talked about barriers put up so that students do not have the first-hand knowledge. Perhaps a higher education workforce will be required. They want to talk to folks who deal with students out of high school. They want to look at consistency for curriculum so that it is rigorous across the board. They want to look at alignment of Pre-K-12 and higher education so that their goals are aligned. Priority one is research and analysis from higher education and workforce. We need to listen to our clients and find out what will work for them.*
- **STEM Education Policy Matters.** *The group discussed alternative certification for teachers, teaching content and real world uses of content. They want to review graduation requirements for potential differences between college and career readiness. Perhaps there ought to be STEM plans for each school and each local school might have its own STEM Advisory Council. It is important that all our students and community be*

competent in STEM content, not just in our students being interested in STEM fields. The group talked about incentives for teachers to teach in Iowa and for teachers to teach in STEM fields, as well as incentives for students to come out of community colleges, high schools, etc. to stay in Iowa in STEM fields. A lot of learning happens outside the classroom. The group talked about how to promote quality programs at the state level or locally. They want to encourage public/private coordination around STEM and encourage the public to come into private and vice versa so that everyone is working together and taking advantage of our resources. Performance reviews and rigor in teacher evaluations and expectations of teachers need to be clear AND we need to give salaries that recognize those expectations.

- **Public Awareness of the Importance of STEM Education for the Economy and Society.** The group discussed best strategies. The group shared examples of messages that are making a difference – TAI, Cyber Safety in Michigan, an Alaska example. They want to investigate how to get the word out. Weaknesses they identified were lack of a common message. Iowans want to glorify the status quo. We need to define the message. Give Iowans a real compelling case for change and coordinate the marketing awareness effort. Why duplicate efforts if it can be avoided? The Iowa Children's Museum has a great message right now for parents. They also want to include some students at the high school and college level, as well as new graduates, in the message. Perhaps Ashton Kutcher could be involved.
- **Public/Private Partnerships and Mapping STEM Education to Economic Development.** The five-year EPSCoR grant aligns with this activity. There is a high level statewide governance committee to create a strategic plan which includes a diverse STEM workforce. They want to connect that planning with the activities here so that we can monitor that going forward. They could use a better inventory of what is going on than what they are personally aware of. They know of Hyperstream through TAI and the Externships program out of IMSEP. How do we scale them? They think there is some infrastructure already in place to leverage which is not being leveraged now, like 4-H. A weakness they observed is that they are too dependent upon personal relationships to make it happen. Iowans are too humble which does not lend itself to marketing. In terms of workforce development, Dr. Rosen talked about some places do not have enough workers in STEM areas yet there is a large number of unemployed. In Des Moines, they have a lot of unemployed IT workers yet it feels like zero unemployment in IT for them. What do they need to do? Alignment is really important around a common direction. Nonprofits and associations could be really important here. A marketing campaign is critical. Yet it should not require a lot of money. A lot of companies are tied to the technology side. They are not as cohesive a group. Marketing will help companies understand STEM is important to their future.
- **STEM Learner Accommodations—the Gifted, Under-Represented, Nontraditional.** The group added women and first generation higher attendees. This group determined they need a lot more data. They want to know the current situation. They have all seen different statistics. They want to see where Iowa is in relation nationally. They also want

to know of other programs out there in Iowa and nationally. They want to take advantage of what's already been done. They had many more questions than answers.

G. From here, Executive Director Weld described a communication process working with committee chairpersons. What can be expected as to support for action planning:

- Resource for information: ACT, Iowa Dept. of Education, evaluation team, etc.
- IMSEP coordination, communication, information access, conduit from the broader Council to the Co-Chairs.

From the Executive Committee

- Guidance and direction
- Will prepare similarly for the January meeting of the full Advisory Council

Co-Chairs

- Leadership
- Advocacy

H. FINAL REMARKS.

Co-Chairs President Allen and Lt. Governor Reynolds offered final thoughts on the day.

President Allen thanked the Council members for their service. He advised that we consider the interests of all parties in the partnership, and that there may be a necessity to narrow the focus and gather information. Quick and meaningful results will be important too.

Lt. Gov. Reynolds conveyed the honor and privilege to co-chair this Council. She expressed gratitude for contributions today while recognizing the work ahead. She appreciated the leadership and time and commitment to the students in the State of Iowa on behalf of Council members. Her commitment is to continue to draw in from people across the state while also narrowing the focus on this work in progress. Excellent progress was made with formation of work groups and subcommittees, and now she looks forward to bringing eventual recommendations to the Governor while looking to possible legislation that we may be able to highlight the benefits to our children for a world-class education and world-class economy for Iowa. She announced that the January meeting will focus on building public-private partnerships.

Adjournment: 3:15PM

Compiled by Jeff Weld